

Don Douglas
Armstrong (J.)
A TREATISE

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ON

SULPHUREOUS WATERS.

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BY JOHN ARMSTRONG, M. D.

Physician to the Fever Institution in London.

AUTHOR OF A TREATISE ON TYPHUS FEVER, &c.

THE END OF EVERY THING SHOULD DIRECT THE MEANS.

William Penn.

STAUNTON, VA:

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TO THE PUBLIC.

IT is matter of serious regret, that none of our distinguished Physicians have furnished the public with their observations upon the efficacy of the Mineral Waters of Virginia in the cure of diseases. Such a publication, which would embrace judicious admonitions in relation to the use of the water, diet, &c. would, doubtless, prove a useful and interesting manuel to those who are in the habit of visiting our watering places, and might, in some degree, prevent, the many injurious effects, which ensue every year, either from the use of waters by no means suited to the disease, or the use of them in immoderate or improper quantities.

In order to supply, so far as is in my power, so desirable an object, I have been induced to republish, in the present form, the most important parts of a publication, upon the Sulphureous Waters of Great Britain, by the celebrated Dr. Armstrong. Of the ability of Dr. Armstrong, and the confidence that may be reposed in his opinions, it would be needless to remark.—He is well known to the Medical world, as an ornament to his profession.

The sulphur waters of the old world differ in no respect from those of our own country, and consequently nothing is hazarded in appropriating to the latter, all the virtues which are ascribed by the author to the former.

The work from which we extract being designed by the author for the use of physicians, rendered it unnecessary for him, elaborately to discuss and enforce certain doctrines and precepts, which, if otherwise treated, would have rendered the publication more extensively useful. In the above remark we refer particularly to the *length of time*, usually required for the successful application of the remedy.

Every one capable of reflection and observation, must acknowledge, that it is as unreasonable, as it has been found impracticable to cure, in a very limited time, those affections denominated *chronic*.—The formation of those diseases requiring the work of time, it would appear, conformable to the operations of nature, that those salutary changes induced by remediate means, should also be gradual. But persons labouring under these affections, too frequently become impatient of the tardy and almost imperceptible operations of the remedy; and, in this way, the best devised treatment, and the only correct remedy, is thrown aside, for the adoption of something whose operation is violent, which seldom fails to rend asunder connections essential to the springs of life. Again—Patients are for the most part ignorant that in some cases a sort of preparation is necessary to ensure benefit from the use of Sulphureous Waters. Some will commence the use of these waters, with sanguine expectations of immediate success, from having understood something of their efficacy in similar affections: But perceiving in some short time, unpleasant effects, without enquiring into the cause, will give up the remedy as worse than useless. If physicians had drawn such general conclusions from similar premises, the Peruvian Bark, and Mercury, remedies of the most acknowledged efficacy, and which also require a preparation for their use, would long since have fallen into disrepute.

In a treatise intended for general use, it would also have been necessary to admonish the patient on the subject of regimen; and to point out those medicinal coadjutants, so requisite in some habits to the salutary operation of the waters. For the instruction of the *profession*, however, enough has been said by the author; and the hints he has thrown out should excite others to obtain satisfactory explanations from those best qualified to counsel them.

The learned writer of the Essay, successfully maintains the doctrine that the mild Sulphureous Waters are decidedly more beneficial in the cure of chronic diseases generally, than those that are stronger; and that the efficacy of these waters, in all fixed diseases, depends chiefly, if not solely, upon the presence of Sulphuretted Hydrogen Gas, not upon the purgative salt held in solution—and this obviates the only popular objection which has been urged against the Augusta Springs, near Staunton, in Virginia.—I allude to the mild purgative operation of its waters.—The author remarks, that the Dinsdale water, which is a mild purgative, may be used with safety, and great benefit in the stages of certain

diseases, where the Harrogate, *which is a much more powerful purgative*, would prove highly injurious ; and observes, *that where more active operation is deemed important, the addition of a neutral salt to the Dinsdale, gives to it all the activity and efficacy of the Harrogate.*

That the water of the Augusta Spring, contains the same substances in solution as that of the Dinsdale in England, as described by Dr. Armstrong, is not doubted by those who have annalyzed them, or witnessed their operation. The effect upon the kidneys, skin, and all the secretary organs is powerful, while it is sufficiently purgative : and the patient daily gains in appetite and strength, under its continued operation.

Gentlemen who visit the Virginia waters, and medical gentlemen in particular, who may feel an interest in this subject, are respectfully solicited to satisfy themselves of the accuracy of this statement, by fair experiment.

ERASMUS STRIBLING.

STAUNTON, May 16, 1826.

SULPHUREOUS WATERS.

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EXTRACT.

Most practitioners, who have pursued the commonly adopted principles of practice, must be ready to confess, that the result of their experience has mostly been unsatisfactory in chronic diseases in general. It was the want of success which led me to abandon the tonic plan in by far the greater number of cases, and the treatment recommended was gradually substituted, and at last its superior efficacy amply confirmed by experience of its effects. Future observation will bear me out in asserting, that the weakness of which patients so constantly complain in chronic diseases, for the most is only the consequence of some venous or arterial fullness oppressing an important organ; and it may be regarded as an axiom, applicable to most cases, that to prescribe solely for a sense of weakness in these affections is a mere delusion, as the states upon which it depends must be removed, before the least approach can be made towards recovery. In the preceding pages it has been attempted to show, how those states are to be removed or lessened when seated in vital parts; yet it must be remembered, that they are only remediable when unconnected with organic derangement, which is their ultimate and mortal product. Nevertheless it is not reasonable to expect, that any plan of treatment will succeed in all cases of chronic disease, even when they are not combined with organic derangement; and I have accordingly found the methods recommended at times ineffectual, even when they were tried under circumstances which simply indicated disorder of function, without any concomitant sign of disorganization. In examples of chronic disease which resist the application of all ordinary means, it is common for physicians to send the patient to some watering place, most frequently with the hope of amusing his mind, and of allowing the sanative powers of nature to operate with the least molestation. So far back as the year 1807, it has been customary with me to send patients of the above description to Harrogate, recommending them to drink the sulphureous water there; and at first I merely did so under the impression, that as the water was a mild purgative it might possibly do some good, aided by the change of scene, and by fresh air. But so early as the autumn of the year abovementioned, my attention was forcibly directed to the power of this physical agent, by its apparently curing an obstinate affection of the liver, which had previously resisted all the usual measures; and since that time I have not

only endeavoured to investigate the operation of the Harrogate, but also of similar sulphureous waters, so that the following remarks may be considered as the result of pretty extensive observation.

The first thing which struck me in regard to the operation of the Harrogate sulphureous water was, that the bowels might be opened by it day after day, week after week, without debility being produced; nay, on the contrary, most of the patients gained both strength and flesh notwithstanding they had daily and copious evacuations. This circumstance alone seemed to give the sulphureous water a most decided advantage over the purgatives in common use; for it must be admitted, that they cannot be long continued in chronic diseases, without diminishing the strength. For some time therefore, I solely attributed the efficacy of the sulphureous water to its purgative property, together with the peculiarity that its long continued exhibition caused no debility; and as for a considerable period, the complaints in which I prescribed were chiefly stomachic and hepatic, I was the more confirmed in this opinion as to its operation. But cases of chronic disease fell under my observation at various times, in which the sulphureous water was most decidedly beneficial, and that too, where the bowels had been but scantily moved; and as the effect in these cases could by no means be purely attributed to its action on the intestines, I was led to inquire whether it might not have some other agency which had escaped my observation. In attending more closely to the changes which this water induced, I found it acted most powerfully on all the secretory organs of the body, but more especially on the liver, on the kidneys, on the villous coat of the intestines, and on the skin. Here a new operation was presented to my inquiry. In reflecting on all the facts which had come before me, I ascertained this water had removed chronic affections of various internal and external parts; and hence at length the inference followed that it was really beneficial as a very powerful alterative, and that it had a direct influence over chronic inflammation, wherever it be seated, whether in the viscera, or upon the surface of the body. In still further pursuing the consideration of the subject, I was fully satisfied, that I had arrived at a general principle in the operation of the sulphureous water; for, some time afterwards, on trial of that at Dinsdale, near Darlington, I found that its effects were also very powerful in chronic inflammations, though it be but slightly laxative. It at once, therefore, occurred to me, that the chief efficacy of the sulphureous waters of Harrogate and of Dinsdale depended upon the sulphuretted hydrogen gas, which they both contained; and indeed the principal difference between these two waters is that the first contains less of the sulphuretted hydrogen gas, but more of the saline materials than the last; so that by adding very small doses of purgative salts to the one, it may be made to operate like the other, in many cases.

Mercury has been universally esteemed the most powerful alterative which has ever been used; and most practitioners are now convinced that its efficacy, in acute, as well as in chronic affections, depends upon its action on the secretory organs. Now in the sulphureted hydrogen gas, we have another agent which acts as powerfully as mercury on the secretory organs; but with this difference, that while the long continued use of the latter, in chronic diseases, generally breaks up the strength, that of the former generally renovates the whole system. The sulphureted hydrogen gas, then has a decided superiority over mercury in chronic diseases in general; and this is not a speculative opinion, for I have proved its correctness in numerous instances by the test of experience. Chronic diseases, as their very name and nature imply, come on and advance by slow degrees, and we mostly find that they can only be overcome by measures, the operation of which is continued for a considerable time. Hence it is that in chronic diseases we do not find bleeding and purging act with the same force and rapidity, as in acute diseases. If we relied upon these as our chief remedial powers, in both diseases, we should be compelled to repeat them more frequently in the former; and even then we should very often break up the general strength, and our success in the main would be much less certain than in acute diseases, which generally yield to a repetition of such active expedients. In chronic diseases, therefore, it is quite a desideratum to possess an agent which shall operate daily and favourably, that the desired change may be at last induced, without injuring the general system by the treatment; and from an extensive observation of its effects, I may confidently affirm, that this agent is to be found in the sulphureted hydrogen gas, combined with laxative agents, in the mineral waters of this country.

It has been observed that the sulphureted hydrogen gas resembles mercury in its operations, inasmuch as it acts on all the secretory organs, but that in one respect it differs from mercury in its operation, inasmuch as its long continued use does not exhaust the energy of the system. There are, however, other points of resemblance between these two remedies, which it may be proper to mention, that the mode of administering the sulphureted hydrogen gas may be fully understood. When the system resists the specific action of mercury, it is a certain test that an inflammatory diathesis prevails to a considerable extent, and this is the cause of the resistance; for lessen the inflammatory diathesis by proper evacuations, and then the specific action of the mercury will readily be induced. Now something similar obtains in regard to the sulphureted hydrogen gas, since when the system is impervious to its influence, it is on account of an inflammatory diathesis in a more than ordinary degree; yet only let that inflammatory diathesis be diminished by the lancet, or by purgatives, and then the sulphureted hydrogen gas will produce all its beneficial effects. This point

it is of great consequence to remember in practice: for as the powers of mercury have often been frustrated through an omission of previous evacuations, so the powers of the sulphureted hydrogen may be frustrated by the same circumstance. Yet in the majority of examples, the phlogistic state does not run so high in diseases of chronic inflammation as to resist the efficacy of the daily administration of the gas; but when those diseases are seated in the head, or in the abdomen, the cure will mostly be much accelerated by procuring a purgative as well as a specific operation from the sulphureous waters. Hence it has appeared to me in cephalic and abdominal affections, that the Harrogate are generally more efficacious than the Dinsdale waters, when simply prescribed as nature has presented them; while on the other hand, the Dinsdale water has appeared to me, more efficacious than the Harrogate, in chronic inflammations of the chest, in chronic inflammations of the joints, and in some very obstinate affections of the skin. But the operation of the Dinsdale water, may be made to resemble that of the Harrogate, by dissolving in it minute portions of purgative salts; and as it contains more of the sulphureted hydrogen gas, so it will sometimes overcome distempers which had resisted the influence of the Harrogate water. During a series of years I have traced the operation of the sulphureted hydrogen gas from one organ of the body to another, from the skin, joints, and eyes, to the viscera of the head, chest, and belly: and the sum of my observations would authorize me to declare, that it is one of the most powerfully antiphlogistic agents which can be found; for wherever the chronic inflammation be seated, it will, I believe, more frequently remove it, than any other mean, provided the bowels be kept regular during its administration.

In several chronic affections of the head and abdomen, when aided by small bleedings and moderate purging, it has effected a cure where mercury had completely failed; and although the efficacy of mercury is so notorious in chronic affections of the liver, yet upon the whole I am disposed to think, that is inferior to that of the sulphureted hydrogen gas. In many hepatic diseases, however, it will be best to combine the operation of these two remedies at the same time; and this plan will often be found of vast advantage, but especially if the Harrogate water be employed so as daily to act as a purgative. Small doses of calomel, or of the blue pill, may be given for a short period every night at bedtime; and a large tumbler-glassful of the Harrogate water may be administered on the following morning before breakfast, and repeated every 20 minutes until it operate by the bowels. But in such cases, the mercury should not often be given longer than a week or ten days: some mild purgative pill may then be substituted at bedtime, and the sulphureous water continued every morning, until the symptoms entirely disappear. In conjunction with this treatment, it will occasionally be requisite to apply a blister now and

then to the right hypochondrium; but in most instances this auxiliary will not be required, though in some obstinate cases, it will be found very efficacious when rapidly repeated. In what are termed stomach complaints, a regular perseverance in the Harrogate water, will frequently do more good than all the medicines in the pharmacopœia; but in these, as in hepatic affections it will sometimes be requisite to assist its purgative operation by an occasional blue pill, or by one of the compound rhubarb or aloetic pills at bed-time; and on certain occasions, a blister may likewise be beneficially applied over the epigastrium, and even repeated so long as the symptoms remain unsubdued. Chronic rheumatism and gout, and almost all cutaneous affections, will yield more rapidly to the continued internal exhibition of the sulphureted hydrogen gas, than to any of the means now commonly employed; but in these, and also in most chronic complaints of the viscera, the recovery will be considerably expedited by the frequent use of tepid baths which contain the sulphureted hydrogen gas. In many parts of this volume I have strongly insisted on the importance of attending to the functions of the skin, both in health and disease; and I am fully persuaded, that much of the efficacy of the sulphureted hydrogen gas is to be attributed to its action on the skin, through the innumerable pores of which it operates with remarkable power. At the same time it is to be recollected, that it is not upon one, but upon all the secretory organs, that it exerts a special influence; but certainly to the skin, as it is so capacious, a large portion of that influence is directed, and next in degree it is generally spent upon the kidneys, both of which circumstances make it so beneficial in cutaneous diseases, and in those of the urinary organs.

A remedy then, so highly efficacious in chronic inflammations in general, might seem at first sight well fitted for phthisis and similar insidious affections; and though my experience is very incomplete with respect to its powers in confirmed consumption, yet it has seemed to me exceedingly useful in several instances where phthisis was distinctly threatened. But this has been more especially observable, when the pectoral symptoms were complicated with hepatic disorder, as frequently occurs; and indeed in the commencement of most fevers of the hectic type, the sulphureous waters have afforded more relief than any thing else. In a few solitary cases, which bore the characters of genuine and confirmed phthisis, in which pus was expectorated, a marked change for the better took place from the drinking of the Dinsdale waters; and I recently saw two remarkable examples, which *appeared* to be cured by this mineral spring, though in both the disease was far advanced when it was first tried. All the measures hitherto recommended by authors having proved most fallacious, it becomes a question of the greatest importance to society, to ascertain precisely the powers of the sulphureted hydrogen

gas, both in the incipient and confirmed phthisis; and as I have formerly shewn that the closest sympathy exists between the lungs, skin, and kidneys, and as I have also ascertained, that this physical agent acts most powerfully on both these organs, the consideration of it has still stronger claims to our regard. Besides, numerous trials have fully convinced me, that in all chronic inflammations of an ordinary nature, this gas has one common and specific operation; and as it cannot be denied that phthisis is an inflammatory affection, we might surely expect it to have some influence. It may however be urged, and justly too, that the inflammation attendant on the tubercular consumption, is not of an ordinary, but of a peculiar kind: yet in answer to this objection, I can state, that the internal and external use of the sulphureous waters are far more efficacious in scrofula than the common measures; for after all the ordinary treatment had failed, I have seen scrofulous affections cured or lessened by drinking these waters; and using them as a tepid bath. Now if phthisis really be scrofula of the lungs, which is my firm opinion, why may it not also prove serviceable in that affection, as well as in others of a similar character, though of a different seat? Dr. Rollo was the first, as far as I know, who suggested the internal use of the sulphureted hydrogen gas in phthisis, but as he did so, in common with some successors, upon merely speculative grounds, the remedy has been disregarded; and if the few facts and hints, which are here offered, should call the attention of the medical public more particularly to the subject, general inferences for or against the efficacy of this agent in phthisis may at last be established, by more extensive trials than I have been enabled to make. But it ought to be mentioned, that in the advanced stages, the Harrogate water is prejudicial in phthisis, by acting on the bowels from the purgative salt which it contains; and though the Dinsdale possess no ingredient of this sort, yet my experience has not enabled me to determine whether it ever produces any thing like a colliquative diarrhœa. At the same time as no such effect was observable in the cases reported above, I am inclined to think it has a decided superiority over the Harrogate water in the advanced stages; indeed this remark is also applicable to examples of apparently incipient or threatened phthisis, except where the liver is affected, and then the Harrogate is perhaps the best.

It is not in phthisis alone that the sulphureted hydrogen gas has been neglected by practioners in general; for in the whole class of chronic diseases, to which it is so peculiarly suited, the ordinary routine of palliatives is pursued in private practice, while this remedy is unnoticed or unknown. Nay, I have heard it said, that some professional men of deserved eminence assert, that the sulphureous waters of this country have no decided efficacy in chronic diseases; *but I dare nevertheless pledge my word, that,*

if they be only fairly and fully tried, they will be found amongst the most powerful agents which ever have been brought to the relief of human maladies. Most patients are sent to drink the sulphureous water at Harrogate for cutaneous affections, and as these are in general connected with disorders of the digestive organs, they are often readily cured; since the sulphureted hydrogen gas, assisted by the minute portion of salts in solution, operate at the same time upon the morbid states of the digestive organs, and upon those of the surface. But from a legitimate generalization of the facts which have fallen under my observation, I am justified in the opinion, that this remedy has a specific action suitable to all diseases where a certain degree of the inflammatory diathesis prevails; and since diseases of chronic congestion in the veins generally require a similar treatment to diseases of chronic inflammation in the arteries, the applicability of the sulphureted hydrogen gas to those shall next be concisely noticed.

For a considerable time the pathology of no diseases embarrassed me more than those which I have denominated congestive: for when of an acute kind, patients were at once overpowered, not only without excitement, but with positive proofs of an oppressed state of the heart and arteries; and when they assumed a chronic character, patients became pale, and apparently feeble, with a similar, but less diminution in the tone of the pulse. In both cases, therefore, the symptoms were very different from those which attend inflammation, and it was not until I obtained morbid dissections, that I became fully convinced of their real nature. Inflammation is a disease seated in the arteries, congestion is a disease seated in the veins; and as inflammation may be either acute or chronic, so in like manner may be congestion. Great discoveries in science, whatever light they may throw at the time they are made, sometimes tend afterwards to retard the progress of knowledge; for men, considering that all has been revealed which can be on the subject, often sit down contented without prosecuting the inquiry any further. Thus it has happened that the great discovery of our illustrious countryman, Harvey, has had an ultimate tendency in preventing us from exploring the many obscurities which still hang over some parts of the circulation of the blood in health and in disease; and thus it has happened, too, since his time, that almost every medical writer, who contemplates diseases chiefly through the vascular system, has placed them in the arteries, and disregarded the veins. But all those acute and overwhelming affections, which destroy before the appearance of reaction, and most of those chronic and oppressive affections, under which patients crawl about pallid and sunk, are seated in the veins of the viscera; and until we cease to view the majority of them as diseases of real debility, we shall only continue to pace

the unprofitable and beaten round of blind, of dangerous empiricism. In a former work I endeavoured to show the superiority of the depletory and the alterative to the purely stimulant plan; and in the foregoing pages have intimated the applicability of a similar but modified plan, to the greater number of those chronic cases which are strictly congestive. But as the strength is only suddenly overpowered by attacks of acute congestion, and as it is slowly sapped by chronic congestion, so in almost all examples, the depletion must be more cautiously made in the last than in the first; for the quantum of depletion which would relieve the system from the load of acute congestion, would frequently exhaust the remains of the latent energy, which the chronic congestion had concealed under the mask of apparent weakness. On the contrary very small or very moderate bleedings will often answer an excellent purpose in chronic congestion, when followed up by purgatives, and a few doses of calomel and opium; but where this treatment does not succeed, and where there still appear evidences of venous fulness about some of the vital regions, then the continued use of the sulphurous waters, with the occasional employment of the warm sulphureous bath, will be preferable to any other known expedients.

The sulphureous waters, it has been affirmed, and could be proved by numerous cases, operate specifically on the secretory organs; so that during their administration a system of evacuation is going on from almost all the capillary exhalants. As this evacuation may be continued for days and weeks, and yet induce no debility, it seems peculiarly calculated for cases of chronic congestion; and accordingly I have frequently seen it most serviceable, where other measures had failed to free the system from superfluity of blood in particular parts. In all chronic diseases of consequence, the functions of the skin undergo great and manifest changes, but this especially happens in those of a congestive kind; for in them the surface is generally blanched, and lax, while the temperature of it is either below the natural standard, or exceedingly variable. But the sulphureous waters used internally and externally, rarely fail to improve the condition of the skin, in chronic congestion; and though the state of that organ be in many respects widely different in chronic inflammation, yet even then they also frequently restore its natural functions. Those shrunk and sallow persons who are deemed nervous, bilious, or hypochondriacal, often labor under some chronic congestion of the brain or liver: and in these cases, the greatest benefit will sometimes result from a steady perseverance in the use of the sulphureous waters. But whenever the head or liver is affected, alvine evacuations should in general be daily procured; so that if the Dinsdale waters be used, a little salt must be added to them, and it will only be necessary when the Harrogate waters

are taken, to give a mild laxative pill the night previous to their exhibition.

In persons who are deemed to be of the nervous temperament, there is a peculiar irritability of the heart, and its action of course is liable to be disordered by slight as well as by severe causes; but these persons generally suffer most from mental emotions, which always make the heart palpitate, and on some occasions it will seem to flutter almost like a bird in the breast. During these inordinate motions of the heart, there are often what we term determinations of blood to the brain, and sometimes to other organs; but a state of collapse often succeeds such determinations, and this collapse again may be followed by imperfect excitements of the heart and arteries. It is thus, as it were, vibrating between one extreme and another, that such persons often pass their lives with but few intermissions of ease, when they are placed where the mind is agitated; and most practitioners must well know from experience, that little or no relief is obtained from the usual remedies, tonics, and antispasmodics. Nor indeed can much good be effected by any measures, unless the mind can be secured against violent shocks; but at the same time, more benefit will be obtained from the sulphureous waters, which act as purgatives, than most other measures. As for tonics and antispasmodics, they are generally worse than useless; but especially the last, which being strong diffusible stimuli, often do serious mischief in naturally irritable habits. The nervous temperament may be hereditary, or it may be engendered by circumstances in the progress of life; but wherever it exists, the heart will be found peculiarly susceptible, and accordingly all excitants, whether mental, medicinal, or otherwise, should be studiously avoided. In many families; but especially where the nervous temperament prevails, some one organ is weaker than the rest, a peculiar defect liable to be transmitted from generation to generation; and in such cases, the weakest organ is sure to suffer from the morbid motions of the heart, from whatsoever causes they may proceed. People of the nervous temperament are often almost as much influenced by vicissitudes of the weather, as by mental affections; and in such instances the skin is generally first disordered, and the heart next. Between the skin and the heart there is a most intimate sympathy, so that the changes induced in the one, often powerfully affect the other; but independent of this nervous sympathy, the abstraction of heat from the surface often powerfully influences the heart, for in that case the blood leaving the superficial retires into the deeper seated veins, and is thus returned superabundantly to the right auricle and ventricle.

It has already been mentioned, that the sulphureous waters will sometimes fail in chronic diseases of disordered action simply: and this probably happens in cases where the blood-vessels have been so long distended, as to have lost in some degree the

power of returning to their ordinary state; but nevertheless in the main run, these waters will answer an admirable purpose in chronic diseases, when deranged structure is not present. At the same time it ought always to be recollected, that they may easily be brought into disrepute from short or imperfect trials of them; and therefore they should for the most part be continued daily, in sufficient quantity, until the disease completely gives way, or until their inefficiency has been fairly proved by an unremitted perseverance. In some chronic cases of ophthalmia, of rheumatism, and of cutaneous affection, I have known them to effect a cure in two or three weeks: while in other cases apparently similar in all respects, twice, thrice, or even four times that period has elapsed before the cure has been accomplished; and what is here affirmed of these external affections is still more strongly applicable to internal diseases, which are seldom speedily overcome by these waters, how completely soever they may yield at last. In illustration of this point as to internal diseases, it may be mentioned, that I have seen both chronic inflammations of the liver, and chronic inflammations of the rectum, where no benefit was produced for three or four weeks; *and yet a continuance of the waters for six or eight weeks longer has effaced every vestige of the morbid indications for which they were prescribed.* The long use of ordinary medicines almost always tends to injure the general powers of the system; but this is not the case with those waters which contain the sulphureted hydrogen gas largely, for they have an invigorating influence, though taken almost daily for weeks together. Yet whenever the sulphureous waters are prescribed, their operation should be narrowly watched; and they should always be omitted for a time when they produce head-ache, a white tongue, or some degree of febrile irritation. Some of these effects may follow their first exhibition, and especially when prescribed for subjects of a phlogistic diathesis; and similar symptoms are also apt to arise occasionally from their long continued use. Before they be re-administered in such cases, the employment of purgatives is commonly necessary, the operation of which generally remove the febrile irritation, so that they afterwards mostly act without occasioning any similar inconvenience. But in all affections combined with vascular fulness the bowels should be daily moved during their exhibition; otherwise they may be liable to heat, and irritate in a way almost similar to mercury. Nor need we fear, with the exception of complaints of the chest, to purge patients freely every day with the Harrogate water; for under this system of depletion, they generally gain flesh and strength, particularly in gastric, hepatic, and intestinal affections. The tepid bath of sulphureous water, along with its internal use, is mostly very serviceable; but the temperature of the bath should be duly regulated, otherwise it may cause considerable exhaustion. The tepid bath of sulphureous water is most indicated in complaints

of the skin, chest and belly; but it ought always to be had recourse to with caution, when the head is affected, as it may increase the flow of blood towards the brain.

Some elaborate and excellent works have been written on cutaneous diseases, but most practitioners will be ready to confess, that the modes of treatment recommended are often ineffectual: the internal and external use, however, of the Harrogate, or of the Dinsdale sulphureous spring, will rarely fail to cure such affections; and indeed I dare assert in general terms, without the dread of refutation, that these seemingly simple compositions of nature are of far more efficacy in diseases of the skin, than all the various and complicated formulæ of art. But in the treatment of all the scaly affections of the skin, it will be found a most important point to remove the scales by friction or some similar means, that the waters may be applied to the skin itself. Indeed I am convinced, that many practitioners fail in complaints of the skin, merely from applying their remedies upon the surface of the scales: whereas if they were to remove the scales daily, the use of the sulphur ointment, or of a tepid bath of sulphureous water, would frequently succeed; provided the digestive organs be properly regulated, for they are often concerned in the production and continuance of cutaneous diseases.

The treatises which have been hitherto published on the sulphureous waters above mentioned have not met with that attention which their merits deserved; but as I was led to investigate and to generalize the operation of these waters, without reference to what other writers had previously done, so perhaps I may be allowed to hope, that my unbiassed research respecting them may induce the medical faculty to give them an impartial trial. For my own part, however, I would not be content that the sulphureous springs of this country should be more frequently recommended than they have hitherto been by practitioners, but that attempts should be made to prepare artificial waters of the same constituents; and though these might perhaps be of less efficacy than the natural springs, still they might prove highly serviceable in the class of chronic diseases, which so often baffle us in private practice. That artificial waters which contain the sulphureted hydrogen gas, may be put correctly and extensively to the test, I should advise them to be used internally as a medicine, and externally as a bath, in some of our large hospitals; where wards could be set apart for those chronic cases to which the sulphureted hydrogen gas appears to be so peculiarly applicable, from its powers of inducing a complete change in the system, through the secretory organs.

The analysis both of the Harrogate and Dinsdale waters shows, that the sulphureted hydrogen gas is the most predominant and active principle in each, and therefore it is natural that we should ascribe the efficacy of these waters to this principle. But both

waters contain some carbonic acid gas, and some azotic gas, and that of Harrogate especially, small portions of various neutral salts, while that of Dinsdale holds some sulphur suspended; so that the first is in reality a purgative, and the last a very mild laxative at best, when taken to the amount of a pint or more in the day. It is on account of the small portion of the neutral salts dissolved in the Harrogate sulphureous water, that it chiefly operates on the bowels; and even in the prescription of purgatives for chronic diseases, we would do well to imitate nature in this particular; for repeated observation has convinced me, that we give far too large doses of purgative salts in chronic diseases, the effect of which generally is to irritate the system first and to exhaust it afterwards. Eight or ten grains of the sulphate of magnesia, with forty or fifty of the common salt, will generally purge mildly and effectually, when dissolved in about a pint of water; and these doses may be frequently repeated without producing exhaustion; whereas if we often prescribe an ounce or an ounce and a half of the sulphate of magnesia, or of a similar salt, in chronic diseases, we should in the end usually find, that considerable debility had been induced from their repeated exhibition and operation. Every grain of salt which we prescribe is probably taken up by the absorbents, and mingled with the mass of blood, before it acts, through the exhalants, as a purgative to the intestines; and if this be the fact, we may readily comprehend, why so much irritation should often follow large doses of salts in chronic affections. In acute diseases, every moment is precious, and therefore the agents which we employ should be given in powerful doses, that they may operate with the least possible loss of time; but in chronic diseases, where there is no occasion to produce an immediate effect in this way, it is surely much better to trust to milder measures, the operation of which cannot do harm if they should do no good. Indeed it appears to me that the whole plan of prescription in chronic diseases stands in need of amendment; for the large doses of purgatives and other medicines, which we so generally give, frequently tend rather to increase than to relieve the symptoms, from the irritation and exhaustion which they produce.

In the preparation of artificial waters, impregnated strongly with sulphureted hydrogen, it will become a question whether the other ingredients should be added, which are found in the natural springs; but a little experience will soon enable us to decide this question, since if the sulphureted hydrogen alone should be found ineffectual, it would follow that the rest are also required for the reduction of chronic inflammation or congestion. From the trials which I have made of the sulphureous waters in chronic inflammation and congestion, it has forcibly struck me, that they might be also serviceable in acute inflammation and congestion, conjointly with other measures of known utility; and

it would not at all surprise me to find the sulphureted hydrogen gas hereafter ranked amongst some of our most efficacious agents, as well in acute as in chronic diseases. Measured by cubic inches, the Harrogate water contains about a twelfth part of sulphureted hydrogen gas, but considerably more than that proportion is in the Dinsdale; and in the common water impregnated with this principle, we might easily so regulate the quantities, as to make its operation vary according to the circumstances of particular cases. Yet perhaps we are too much accustomed to suppose, that we can successfully imitate, by artificial means, the effects of mineral waters, because we detect such and such ingredients in them by analysis. It is highly probable, however, that these ingredients, or their elements, exist in certain combinations which we cannot imitate, and which are changed by our very modes of analysis; so that though artificial may approach in the operation to natural mineral waters, yet the latter will always perhaps be found to possess powers which human ingenuity can never communicate to the former. Some part of the efficacy of mineral waters may perhaps depend upon the simple principle of dilution; and to this principle is to be attributed most of the utility of such remedies as the decoction of sarsaparilla, which many so highly value. The effects of the common waters which we daily drink, is a subject deserving of more consideration than it has received. It would probably be found, on inquiry, that many complaints are connected with the substances which they contain. Why, for example, does the stone so much more frequently occur in some counties than in others? The state of the fluids may be affected, and thence of the solids, by our ordinary drinks; and it is not unlikely, that in this way, ossification and similar affections of the arteries are sometimes produced.

The sulphureous waters, like many other things, have probably been neglected, because they are openly presented to our observation, and appear exceedingly simple at first sight; but it seems to me, that the beneficent Author of our being has intended them for the advantage of mankind, how much soever they have hitherto been disregarded. The whole world around us is a spectacle of beauty or sublimity, the impressions of which upon our senses are fitted to promote our happiness in health; and is it at all unreasonable to suppose, that things have also been prepared to restore us from many of the sufferings of sickness? It is my firm opinion, that physic might be greatly advanced by a minute inquiry into the medicinal properties of those substances which are presented and prepared by nature; and as the subject is one of mighty interest to mankind, so it is to be expected that it will not be overlooked in the prosecution of the chemical combinations of the present times. The consideration of the sulphureous waters alone suggests, that if one gas may be taken into the stomach, absorbed, and carried through the circulation

with striking benefit, others also may probably be found, which might be useful in various diseases; and as the inhalation of gases has hitherto only ended in disappointment, a different result may perhaps be anticipated from their employment in a different mode. But it is not this circumstance alone which strikes us in reflecting upon these waters, for the small portions of salts dissolved have active and excellent powers; and therefore we are naturally led to suppose, that we should attend to the minute divisibility of many of the preparations in common use. The mineral springs which contain iron have only a very small portion of that metal suspended in them, and yet they are far more efficacious than the ferruginous preparations which we prescribe; and here we are again led to conclude, that our ordinary mode of administering this metal should be abandoned, and one substituted similar to that which nature has offered to our observation. There is a divisibility in the preparations of nature, which is unpractised in the usual combinations of art; and it would probably be well for mankind, if this divisibility were much more frequently imitated in medical prescriptions.

My principal reason for having thrown together some general remarks on chronic diseases, was to put the medical public in possession of the results of my experience concerning the sulphureous waters; but as, in the existing state of things, these waters cannot be resorted to by a numerous class of patients, I have mentioned the means most useful where such auxiliaries are not procurable. If, in objection to the general doctrine laid down concerning the nature of slow diseases, I should be asked, were they *all* uniformly marked by chronic inflammation or chronic congestion, I would certainly answer, that the most essential parts of those diseases *generally* consist in these two states. Yet it must be acknowledged, in the first place, that a disorder in the functions of some of the important organs does exist for a considerable time, without unequivocal symptoms either of chronic inflammation or chronic congestion. From what cause, then, do these disorders of function arise? The progress of such affections generally shows, that they must at all events be closely connected with one or other of these morbid states, however latent or obscure; because if the disorder of function be not removed either by nature or by art, chronic inflammation or chronic congestion in time becomes manifest, and a foundation may therefore be laid for derangement of structure. Thus we have an almost evident proof, that even in the minutest of the capillaries, chronic inflammation or chronic congestion may long obscurely exist, and only come slowly into open view at last. What we usually call predisposition to a disease, in an organ, probably consists in a degree of preternatural accumulation of blood in the capillary vessels of that organ; so that when any constitutional shock comes to disturb the action of the heart materially, the mischief falls upon the

part thus pre-disposed, because there the capillary circulation would be most impeded. Since the time of John Hunter, it has become the fashion in this country to explain all morbid phenomena simply by stating that they depend upon some *change of action*; but this word change of action is a general term without any precise signification, and is only calculated to conceal our ignorance from ourselves. If the term change of action be applied to the arteries and veins, its application must be exceedingly limited, because the action of these vessels themselves is limited. The arteries seem to possess the *vis reciliendi*, or what might be mechanically termed *re-action*, the power of recoiling from the stroke of the heart, and they likewise seem to possess the property of accommodating themselves to their contents. This last property, which perhaps might be termed their irritability, the veins also possess in common with the arteries; and it is not improbable, that this property may be so impaired in certain states of the system as to allow the blood preternaturally to accumulate in them, and thus pave the way to many acute as well as chronic diseases. But mere change of action in a vessel, as above explained, will not account for all the facts which we daily observe in morbid deviations; and we must take into account the state of the fluids which circulate in, or are secreted from these vessels, together with the conditions of the nervous system, before we can at all satisfactorily solve what we now call mere change of action.

But there is a state of the circulation, local as well as general, which has been confounded with inflammation, both in acute and chronic diseases, and yet this state differs from inflammation. When it occurs locally, it is marked by a change in the secretion of the part, as, for example, we may daily see in the investing membrane of the tongue in chronic and in acute complaints; and nevertheless, though we are fully satisfied that the part is morbidly affected, yet we cannot pronounce that affection to be inflammation. When this state occurs generally, it is always accompanied with an increase in the action of the heart, and an increase in the animal heat, though the blood seems so equally distributed throughout the system, that no one viscus can be said to be more decidedly disordered than the rest; but even in this case there is a change produced in the secretions which alike attends the local as well as the general state of the circulation, tho' in the local there generally appears to be some topical accumulation of blood, which does not however, amount to the measure of inflammation. Still, both in acute and chronic diseases, this local and this general state of the circulation may pass into inflammation, and in fact frequently does so, where it is not spontaneously or artificially removed; and hence, in both acute and chronic diseases, inflammation may arise at some period of their progress, though in the first instance they were not complicated with in-

flammation. At present we have no word in our language to mark this state as essentially distinct from inflammation; but as it occurs in many diseases, perhaps for want of a better, it might be discriminated by the term *simple excitement*.

Where disorder of function alone, as frequently occurs in the stomach and liver, marks the deviations from health, the sulphureous waters are exceedingly serviceable; for by reaching and searching the most minute ramifications of the capillaries, they remove the morbid condition of these vessels, which are so apt, on mechanical laws, to be the first seats of disease, from their immense number and tenuity. And where chronic congestion of the veins exists in combination with a real exhaustion of the heart, as we sometimes see in the inhabitants of large towns, the use of these waters, but particularly of the Dinsdale, is sometimes attended with the most striking benefit; as they contribute to communicate an energy to the whole muscular fibre, and an exhilaration to the spirits, which are never witnessed from the administration of ordinary means, under similar circumstances. In these long continued diseases, where manifest proofs of disorganization exist, it is far too much the practice to prescribe long and severe courses of mercury, which in general, so far from doing any good, only hurry patients to the grave. In fact, all that we ought usually to attempt in such cases, is to lessen suffering, and to protract life; and for both of these intentions the sulphureous waters, with pure air, and occasional anodynes, will frequently answer the best purpose. It must be familiar to every person of experience how rapidly sometimes the general powers give way under a continued system of ordinary evacuation, even when chronic inflammation or chronic congestion is uncombined with any actual disorganization; and it is of great importance that this truth should be constantly before the mind of the practitioner, lest he push his measures so far as to prejudice the patient while he leaves his disease unsubdued. But the system of evacuation produced by mineral waters, when properly used, has none of these debilitating effects; and therefore it is a desideratum in physic to ascertain their powers more precisely than has hitherto been done, especially in slow diseases, which baffle the ordinary means. Chronic inflammation of the uterus may be ranked amongst the most formidable of those diseases, under some of its modifications; and it would be particularly desirable to ascertain whether the external and internal use of sulphureous waters would be serviceable, since many of the means usually employed hardly deserve the name of palliatives. It has been intimated to me, by one whose judgment I highly respect, that I have shown an attachment to particular remedies, but especially to sulphureous waters. In the history of medicine, nothing is more striking than the undue partiality which writers show towards certain agents which they have been accustomed to use; and it would be

presumption in me to suppose, for a moment, that I am so far exempt from bias as to have escaped a common imperfection of human nature. In my future observations, however, I shall endeavour to take a cautious review of the influences of those measures which have been recommended; and if a more extended experience should convince me of any mistake, that mistake shall be acknowledge and corrected without hesitation. Yet so strong is my confidence of the efficacy of sulphureous waters in slow diseases, attended with functional disorder, that I could wish some of the intelligent practitioners who reside at the springs would collect and publish a series of cases in which those waters were employed. The simple recital of such facts would, I believe, teach a most instructive lesson to the medical world; for it would show that whatever yet may have been effected by mercurials and purgatives in chronic complaints, may often be more pleasantly and completely effected by these simpler means.

It will at once strike the accurate observer, that there are some diseases, which though they may be connected with chronic inflammation or chronic congestion, yet have something so peculiar in them, as to deserve the epithet specific; and among such remarkable affections may be mentioned, diabetes and cancer, the characters of which are so distinct, and the nature so obscure. In one, if not in both of these complaints, the fluids undergo changes, which have not yet been sufficiently regarded: and however we have neglected the humoral pathology in modern times, its investigation is really calculated to throw great light on some parts of medical science. Whether the sulphureous waters could be successfully applied to diabetes, cancer, and other diseases, which have hitherto been so unmanagable, must be left for others to determine; but certainly from their known efficacy in numerous diseases which resist ordinary measures, they deserve a fair trial in these peculiar affection; and the more especially so, since if they should not prove beneficial, they would at least be perfectly harmless.

Pathology and physiology are so intimately related, that the doctrines of the latter frequently extend their influence to the former; and it has appeared to me, that the progress of physic has often been retarded by physiological arrangements founded upon artificial distinctions. Perhaps the most natural order in which the functions of the body could be classed, would be into the vital, the mechanical, and the chemical. The vital functions are chiefly referrible to the brain, nerves, and spinal cord; the mechanical chiefly to the heart, vessels, and muscular powers; and the chemical chiefly to the fluids, circulating in or secreted from the vessels. These functions have each their peculiar laws, yet they are connected with each other. Perhaps in certain diseases, the vital functions are chiefly in fault, in others the mechanical, and in some the chemical. Yet so intimate is the relation be-

tween these functions, that in many acute and chronic complaints, they all seem to participate. Thus, for example, contagion primarily affects the vital functions through the nervous system, then the action of the heart and vessels become disturbed, and lastly the secretions undergo manifest alterations. Again, an irritation of some part shall be slowly produced, and exist sometime without apparently exerting any influence on the general habit; but at length the irritation acts upon the heart, thence upon the arterial system, and the secretions in like manner are finally changed. But the order here mentioned, as to the functions affected, does not always obtain, for the first deviation from health may be in the mechanical or the chemical functions, so that the vital may only be secondarily implicated. Any system of physic, which, as such, shall make ~~approaches~~ towards stability, must comprehend each of these functions, with their respective influences, in a state of disease, upon the various tissues of the body; and it has been the error of most medical writers that some bias towards a favourite doctrine has prevented them from taking a comprehensive survey of morbid phenomina. There are yet some relations to be discovered between the nervous and vascular systems, which will materially change the aspect of pathology; and chemistry has also yet to reveal some secrets in the doctrine of the fluids by which we shall be led to important and useful changes in theory and practice.



